

alluding to one or two of the reports of European officials, which will show that, however weighty their evidence may be as regards the practical side of the question, their opinions in scientific matters are open to criticism. Mr. Day had drawn attention to the destruction of fish by various kinds of crocodiles, very properly recommending that rewards should be paid for their eggs. To this one of the officials replies :—"Waging war against such fish-destroying animals as crocodiles appears to me absurd. I have no doubt at all but that a general destruction of crocodiles would directly frustrate the end hoped for by their destruction. Their very presence in numbers, it being given that they live on fish, shows that the supply of fish is abundant, which is all that anyone requires, and nature in these matters, if left alone, keeps the balance even, and resents interference." This is exactly the same view as that held by the modern advocates of a general preservation of birds, who would preserve even such as the sparrow-hawk and cormorant, and who forget that nature itself, in distributing animal life, does not always consult the convenience of man. In India, the presence of tigers, poisonous snakes and crocodiles, would appear to prevent this doctrine from being generally adopted by the European community. Another official refers to a "very exhaustive and carefully drawn up report" from a Civil Surgeon in his district; this report is accompanied by a list of the freshwater fishes, in which occur some species with Buchanan-Hamilton designations, others with Latin terms derived from a dictionary, a cod-fish, a john dory, and "a very common fish, the scientific name of which is supposed to be *Lacerta scincus*!" Can anyone doubt after this that a comprehensive and well-illustrated hand-book of Indian Freshwater Fishes with an introductory treatise on the elements of Ichthyology is called for?

ALBERT GÜNTHER

KOHLRAUSCH'S "PHYSICAL MEASUREMENTS"

An Introduction to Physical Measurements, with Appendices on Absolute Electrical Measurement, &c. By Dr. F. Kohlrausch. Translated from the Second German Edition by T. H. Waller, B.A., B.Sc., and H. R. Procter, F.C.S. (London: J. and A. Churchill, New Burlington Street, 1873.)

MESSRS. T. H. WALLER and H. R. PROCTER have furnished us with a translation of the second edition of Dr. Kohlrausch's "Physical Measurements," to which they have added several useful Appendices and Tables.

Their work is intended to serve as a text-book for students in experimental physics, and consists mainly of a collection of the formulæ used in correcting and applying the results of the simpler experiments in weighing and measuring, heat, light, electricity, and magnetism, accompanied in each case by such an account of the method of observation employed as may suffice to render them intelligible.

The limits which the author assigned to himself are very clearly laid down in the Translators' preface, in which we are informed that "descriptions of apparatus are but rarely given, as students mostly have instruments provided for them," and also that "the mathematical knowledge

required is but very elementary, as the proofs of the formulæ are only given when they present no complex arguments," but it should perhaps have been added that, even in cases where the apparatus is simple, outlines of the mode of performing an experiment are generally alone supplied, the teacher being left to explain to his pupils the niceties of arrangement and manipulation.

Regarded as a syllabus of a course of physics, the book is incomplete, no account, for instance, being given of Favre and Silbermann's Calorimeter, or, with the exception of saccharimetry, of experiments on polarised light; and if the author's plan be thought to justify the exclusion of these, the same reason can hardly account for the omission of methods for determining melting points, or the specific gravity of substances whose constitution is altered by exposure to the atmosphere, or the ratio of the intensities of the illuminations produced by two sources of light, or of all experiments relating to the capillary elevation of liquids in fine tubes.

It is, however, as a collection of formulæ that "Physical Measurements" is likely to prove most useful, and from this point of view the "Introduction" seems to us one of the best parts of the book. It contains the rules for finding the mean and probable errors of a set of observations, and for determining empirical constants by the method of least squares, together with hints as to how to shorten the labour often wasted in the calculation of corrections; points on which a short practical treatise like that here provided will afford great assistance to those who are not mathematicians.

The sections devoted to weighing and measuring are full and good, especially those which relate to the use of the balance, but heat and light are not treated of in an equally satisfactory manner.

The experiments on these subjects which are described are not numerous enough to satisfy the requirements of large laboratories. Moreover, sufficient attention seems scarcely to have been paid to the fact that students should be encouraged to apply corrections to the results of experiments which they perform, not so much on account of the more accurate numerical values thereby obtained, as for the sake of the excellent practice the necessary observations often afford, and the insight gained into the theoretical principles on which they are founded. A case in point is the omission in the article on the Determination of Specific Heats by the Method of Mixtures of any account of the correction employed by Regnault for the loss of heat by radiation.

We miss all mention of the optical bank, and the mathematical expressions for results involving the determination of distance in terms of differential measures on that instrument. In the article on the spherometer, which is in other respects incomplete, we see no instructions for finding the radius of a spherical surface too small to permit the instrument to be placed upon it; and omissions are made in the pages devoted to the spectrometer, the goniometer, and elsewhere, which combine to render the section on Light very imperfect.

Nearly one half of the book is given up to Electricity and Magnetism, subjects in the study of which assistance can be more readily rendered by the method of treatment here adopted than in those we have been discussing, as numerous mathematical formulæ are required which are

in many cases obtained by calculations beyond the grasp of the less advanced pupils; and the Translators have considerably improved what was already good by several Appendices, among which one of the most important is that on Thomson's electrometer. Some preliminary sections are devoted to the reduction of observations made with the mirror and scale to angular measure, to the determination of the position of equilibrium and time of oscillation of a magnetic needle and similar topics, while the methods of reading the various magnetometers and galvanometers, and the measurement of resistance and electromotive force, are afterwards discussed.

On the whole the principal fault we have to find with the book is a want of fulness, especially in the earlier portions. It aims at supplying a want already felt, and which will become still more pressing as the number of those who make some progress in the study of Natural Science increases, and we are not aware of the existence of any manual which gives the information contained in it in an equally compact and handy form; while the tables, thirty in number, which fill the concluding pages, will often save time and trouble to those engaged in laboratory work. Although, then, as we have already pointed out, we consider it capable of very considerable improvement, yet probably most teachers of Experimental Physics will obtain some useful hints from its perusal, even if they do not adopt it as a text-book for their pupils.

A. R.

OUR BOOK SHELF

Pheasants for Coverts and Aviaries. By W. B. Tegetmeier, F.Z.S. (London: Horace Cox. 1873.)

ANY work on animals which appeals to so many different human weaknesses as the Pheasants, must be popular if the least effort has been made to do the subject justice. The one before us has merits which make it peculiarly acceptable. It is by the hand of an author who has devoted his life to the careful study of the natures and habits of the Gallinaceous birds and Pigeons, and who has long since made himself well known by works on some of the genera, which have become the standard literature of the points on which they treat. In the handsome volume before us Mr. J. W. Wood's excellent and truthful illustrations add greatly to its value, though the absence of coloration has made it more than difficult in some cases to produce an approach to the gorgeous appearance of some of the species depicted. Among those that suffer most from this deficiency, are the Japanese Pheasant (*Phasianus versicolor*), whose chief beauty consists in the richness and delicacy of the shades of its plumage, and the Golden Pheasant (*Thaumelia picta*), with its ally, the Amherst Pheasant (*T. amherstiae*), whose resplendent hues even the best artist finds it difficult to represent. The Reeves' Pheasant (*P. reevesii*), and the Eared Pheasant (*Crossoptilon mantchuricum*), however, form excellent and most truthful pictures, colours in them not being such important features. Mr. Tegetmeier, besides describing each of those species which are the love of the sportsman and the pride of the aviary, devotes the earlier part of his work to the discussion of points of great practical interest. After a short history of the Pheasants as a family, from which it is clear that they were introduced into this country from Asia Minor, the native home of the common Pheasant (*P. colchicus*), as early as the reign of King Harold, and probably by the Romans, a series of chapters is given on the management of the bird in preserves and in confinement, together with

an account of the diseases to which it is most liable. These are replete with practical detail that must be most valuable to the many who spend such large sums on preserving game, and to those who have the actual superintendence of the coverts themselves. Particular attention is drawn to the great difference between birds, like the common Fowl (*Gallus bankiva*), which are capable of domestication in the true sense of the word, and the Pheasants, which, though individuals are frequently known to become tame, can never be really domesticated; even the young ones taking to the woods on the earliest opportunity, whilst the opposite inherent peculiarities of the poultry have given rise to the proverb—"Curses, like chickens, come home to roost." Altogether this work supplies a long-felt want, and its perusal will well repay anyone who takes it up.

LETTERS TO THE EDITOR

[The Editor does not hold himself responsible for opinions expressed by his correspondents. No notice is taken of anonymous communications.]

Wasps

PERHAPS it may be of interest to some of your readers, who make entomology their study, to know that the wasps in a nest about a mile from this were still tolerably active on the 13th of this month, when my attention was attracted by the loud buzzing of three or four wasps at the entrance, apparently ventilating it with their wings after the manner of bees. I again visited the place on the 23rd. There were at first no signs of life outside; but stamping on the ground above caused a considerable number to come out after a minute or a minute and a half and hover in the air above the entrance. I attribute this unusual circumstance to the mildness of the season (the minimum temperatures having been 26° in October, 25° in November, and 29° on the 10th and 11th of December, and the 13th having been mild, and so also the 23rd) and the bad conducting power of the nearly cut out peat bog in which the nest was situated.

Birr Castle, Parsonstown, Dec. 24, 1873

ROSSE

The Potato Disease and Lord Cathcart's Prize

No one acquainted with botanists and botanical science can feel surprised at the decision of the committee in this matter, and it must be confessed that, however well meant, the offer of the 100*l.* prize was a great mistake which has only ended in producing ninety-four unsatisfactory essays and the loss of a year.

Little else could have been expected, for the Council of the Royal Agricultural Society must surely be aware that the men (in this country at least) who are competent to write anything *new* on the subject could certainly be counted in units, and these men could not enter into the competition for more reasons than one, not the least being the loss of status such a proceeding would entail.

It appears to me that the committee have even now hardly hit the right nail upon the head in recommending a grant of money to "some competent mycologist" to investigate the life history of the fungus during a certain period of its life. If the investigation is carried on by any *one man* it is sure to end in failure. It would be far better for the committee to recommend that *five or six* competent botanists should each write an essay on the subject from his own point of view, each essay to be published in the Society's journal. There are many reasons why this would be best. I will give one. Payen has figured and described certain ciliated bodies found in spent potatoes, and which Berkeley and other botanists have looked upon as the probable resting-spores of the *Peronospora*. Montagne has referred these same bodies to the *Sepedoniæ*, whilst I am by no means sure that the objects do not belong to the *Stilbaceæ*, and are no other than *Volutella ciliata*. However this may be, I have met with the last in spent potatoes in immediate connection with the *Peronospora* itself. Where competent observers differ in opinion it is better to get the views of all. It would be very unwise to restrict the observations to any particular period of the growth of the plant, and very little would be added to our knowledge were the resting spores themselves found; for, resting spores or no resting spores, it is an ascertained fact that the living